

From	To	Wind Height	Wind Diameter	Wind Area	Height Factor	Element Wind Load
		mm.	mm.	mm <sup>2</sup>	Kgs/m <sup>2</sup>	N
10	20	1539.00	3474.24	8.609E+06	0.00000	0.00000
20	30	3158.75	3474.24	2.646E+06	0.00000	0.00000
30	40	3919.75	3470.88	2.640E+06	0.00000	0.00000
40	50	4325.00	3470.88	173544.	0.00000	0.00000
50	60	7663.00	3470.88	23.00E+06	0.00000	0.00000
60	70	13976.0	3469.20	20.82E+06	0.00000	0.00000
70	80	27733.0	3464.16	74.53E+06	0.00000	13675.8
80	90	39990.0	3460.80	10.38E+06	177.689	22530.6
90	100	41952.4	3460.80	2.986E+06	177.689	43485.0

End of Vortex Shedding Calculations

### Wind Vibration Calculations

This evaluation is based on work by Kanti Mahajan and Ed Zorilla

#### **Nomenclature**

Cf - Correction factor for natural frequency  
 D - Average internal diameter of vessel mm.  
 Df - Damping Factor < 0.75 Unstable, > 0.95 Stable  
 Dr - Average internal diameter of top half of vessel mm.  
 f - Natural frequency of vibration (Hertz)  
 fl - Natural frequency of bare vessel based on a unit value of (D/L<sup>2</sup>) (10<sup>4</sup>)  
 L - Total height of structure mm.  
 Lc - Total length of conical section(s) of vessel mm.  
 tb - Uncorroded plate thickness at bottom of vessel mm.  
 V30 - Design Wind Speed provided by user m/sec  
 Vc - Critical wind velocity m/sec  
 Vw - Maximum wind speed at top of structure m/sec  
 W - Total corroded weight of structure N  
 Ws - Cor. vessel weight excl. weight of parts which do not effect stiff. N  
 Z - Maximum amplitude of vibration at top of vessel mm.  
 D1 - Logarithmic decrement ( taken as 0.03 for Welded Structures )  
 Vp - Vib. Chance, <= 0.314E-05 (High); 0.314E-05 < 0.393E-05 (Probable)  
 P30 - wind pressure 30 feet above the base

#### **Check other Conditions and Basic Assumptions:**

#1 - Total Cone Length / Total Length < 0.5  
 0.000 / 41240.004 = 0.000

#2 - ( D / L<sup>2</sup> ) \* 10<sup>4</sup> < 8.0 (English Units)  
 - ( 13.54 / 135.30<sup>2</sup> ) \* 10<sup>4</sup> = 7.396

Compute the vibration possibility. If Vp > 0.393E-05 no chance. [Vp]:

= W / ( L \* Dr<sup>2</sup> )  
 = 3823414 / ( 41240.00 \* 4105.113<sup>2</sup> )  
 = 0.000

Since Vp is > 0.393E-05 no further vibration analysis is required !

### Platform Load Calculations

ID	Wind Area mm <sup>2</sup>	Elevation mm.	Pressure Kgs/m <sup>2</sup>	Force N	Cf
PF#1	1650000.00	4299.50	80.24	1298.26	1.00
PF#2	1320000.00	6650.00	90.26	1168.30	1.00
PF#3	1320000.00	12100.00	104.24	1349.27	1.00
PF#4	1320000.00	17700.00	111.97	1449.35	1.00
PF#5	1320000.00	22800.00	116.95	1513.83	1.00
PF#6	1320000.00	24750.00	118.86	1538.48	1.00
PF#7	1320000.00	25350.00	119.44	1546.06	1.00
PF#8	2640000.00	31000.00	123.68	3201.73	1.00
PF#9	1320000.00	34100.00	125.49	1624.28	1.00
PF#10	1320000.00	34200.00	125.54	1625.03	1.00
PF#11	1320000.00	34600.00	125.78	1628.05	1.00
PF#12	2640000.00	38600.00	128.11	3316.53	1.00
PF#13	21535200.00	42800.00	130.21	27497.57	1.00

### Wind Loads on Masses/Equipment/Piping

ID	Wind Area mm <sup>2</sup>	Elevation mm.	Pressure Kgs/m <sup>2</sup>	Force N
SUPPORT GRID	0.00	10835.00	101.48	0.00
N9 INT PIPE	0.00	4600.00	81.56	0.00
N1 INT. PIPE	0.00	8100.00	95.51	0.00
SUPPORT GRID	0.00	36433.00	126.85	0.00
CHIMNEY TRAY	0.00	35088.00	126.06	0.00
DEMISTER 1	0.00	33789.00	125.30	0.00
N5 INT PIPE	0.00	32125.00	124.33	0.00
DISTRIBUTOR 1	0.00	31537.00	123.99	0.00
HOLDDOWN GRID	0.00	31114.00	123.74	0.00
SUPPORT GRID	0.00	26955.00	121.01	0.00
CHIMNEY TRAY	0.00	25624.00	119.71	0.00
DEMISTER 2	0.00	24710.00	118.82	0.00